

PATENT CLAIMS

1. An apparatus for temperature regulation/limitation for a heat generating installation, which has at least one measurement sensor ( $T_k$ ) which is connected to a regulator (20) which is connected via a communication interface (30) to an automatic heating system (40), characterized in that the automatic heating system (40) has a safety module (41) which compares the temperature which is detected by the measurement sensor, is passed on to the regulator and is transmitted from the regulator via the communication interface to the automatic heating system with a maximum permissible safe temperature ( $T_{STB}$ ) which is stored in the safety module (41), and in that the safety module (41) generates a switch-off signal on reaching or exceeding the safe temperature, which switch-off signal causes the installation to be switched off by the automatic heating system.
2. The apparatus as claimed in claim 1, characterized in that a further measurement sensor ( $T_k$ ) is provided, and is connected to the regulator (20).
3. The apparatus as claimed in claim 1 or 2, characterized in that a sensor value/test value switching module (10) is provided, which has at least one switch (15, 16) which connects a reference resistance (13, 14) in parallel with the measurement sensor resistance (11, 12), and in that the switching between the temperature sensor resistance (11, 12) and the reference resistance (13, 14) is controlled by the automatic heating system (40).
4. The apparatus as claimed in claim 3, characterized in that a test requirement unit (42) for the automatic heating system transmits a test requirement signal to the sensor value/test

value switching module (10), as a result of which at least one test value ( $T_{Test1}$ ,  $T_{Test2}$ ), which is derived from the reference resistance, is transmitted via the communication interface to the automatic heating system (40).

5. The apparatus as claimed in claim 4, characterized in that the sensor/test value derived from the measurement sensor/reference resistance (11, 12, 13, 14) is processed further by the regulator (20) before it is transmitted via the communication interface (30) to the automatic heating system (40).

6. The apparatus as claimed in claim 5, characterized in that a multiplexer (21), an analog/digital converter (22), at least one shift register (23, 25) and a linearization module (24) are provided for further processing of the sensor/test value.

7. The apparatus as claimed in one of the preceding claims, characterized in that the communication interface (30) for connection of the regulator (20) to the automatic heating system (40) is in the form of a data bus or a radio link.

8. A method for checking the operation in particular of the temperature regulation/limitation function for a heat generating installation, which has at least one measurement sensor ( $T_k$ ), a regulator (20), a communication interface (30) and an automatic heating system (40) with the measurement values ( $T_1$ ,  $T_2$ ) which are derived from at least one measurement sensor being passed on to the regulator for further processing and being transmitted via the communication interface to the automatic heating system, characterized in that the automatic heating system compares the received measurement values ( $T_1$ ,  $T_2$ ) with a maximum permissible safe temperature ( $T_{STB}$ ) and in that a switch-off signal is generated on reaching or exceeding the safe temperature ( $T_{STB}$ ).

9. The method as claimed in claim 8, characterized in that a test requirement signal is generated for functional checking of the measurement value recording and/or for further processing of the measurement values and/or for transmission of the measurement values from the automatic heating system, and in that the response to the test requirement is received by the automatic heating system within a defined time period and is then evaluated by the automatic heating system.

10. The method as claimed in claim 9, characterized in that the response to the test requirement is provided with a specific attribute.

11. The method as claimed in one of claims 9 or 10, characterized in that the response to the test requirement signal comprises test values ( $T_{Test1}$ ,  $T_{Test2}$ ) which are compared with reference values ( $T_{Ref1}$ ,  $T_{Ref2}$ ).

12. The method as claimed in claim 11, characterized in that, if the comparison between the reference and the test values does not correspond to an expected value, a fault message is generated, or in that lack of the response to the test requirement indicates a failure of the measurement sensor resistance/reference resistance or of the regulator, or indicates a communication fault, and in this case the automatic heating system locks the burner after a time delay.

13. The method as claimed in one of claims 8 to 12, characterized in that the measurement values ( $T_1$ ,  $T_2$ ) are compared with a maximum permissible temperature difference  $T_{diff}$ , and in that, once this temperature difference has been exceeded, a safety switch-off is carried out by the automatic heating system, and in that, if the permissible temperature difference is once again exceeded within a specific time, the automatic heating system locks the burner.

14. The method as claimed in one of claims 8 to 13, characterized in that a check is carried out to determine whether the safe temperature ( $T_{STB}$ ) is exceeded as a result of a subsequent heating effect after the burner has been switched off, and in that, if this is the case, the count ( $Z_{off}$ ) of a counter is incremented, and in that the automatic heating system locks the burner when the current count ( $Z_{off}$ ) reaches a predetermined maximum permissible limit value ( $Z_{STB}$ ).

15. The method as claimed in one of claims 8 to 14, characterized in that a safety function is used for unlocking, which allows a maximum number of unlocking operations within a defined time period, with this function being effective only for unlocking via the communication interface.

16. The method as claimed in one of claims 8 to 15, characterized in that the sensor and test values are transmitted as a data message periodically and automatically

from the regulator to the automatic heating system, or are transmitted asynchronously to the automatic heating system as a response to a requirement from the automatic heating system, with this then being checked by the automatic heating system in both cases.